Neurosurgical Service
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Methyl Methacrylate Cranioplasty
13 Years Experience with 417 Patients

By

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With 4 Figures

Summary

The use of methyl methacrylate for cranioplastic repair in 417 patients over a 13 year period has been presented. Its advantages have been noted as well as the indications and the operative technique. Infection has occurred in less than one percent, and half of these cases (2) were due to surgical errors.

Operations for repair of cranial defects have been performed for many years, and a good historical account is given by Reeves. Many different materials have been used which have included bone (autogenous, homogenous, and heterogenous), metal (aluminum, gold, silver, lead, vitallium, ticonium, tantalum, and stainless steel), and alloplastics (celluloid and acrylic resins). The use of many of these substances has been discontinued, but acrylic resin, tantalum and bone are ones that have remained popular and are in current use by neurosurgeons and plastic surgeons.

Bone and tantalum cranioplasties were being performed by the Neurosurgical Service at Walter Reed General Hospital until 1957 when the acrylic resin, methyl methacrylate, was evaluated. Methyl methacrylate is known by various trade names as lucite, vitacrylic, plexiglass or crystallite.

Since our preliminary evaluation with methyl methacrylate, we have continued to use it as the material of choice, to the virtual exclusion of all others. 417 patients have had insertion of methyl methacrylate prostheses from 1957 through 1969.
Pre-operative Evaluation and Operative Procedure

Prior to surgery, complete x-ray examination of the skull is performed, and where the defect includes an air sinus region, special attempts are made to try and determine the presence of any air in the sinus which would preclude the performance of the cranioplasty, but indicate the need for a further exenterative procedure. Evidence of osteomyelitis is a contraindication to cranioplasty.

Fig. 1. Technique of drilling wire hole in skull to prevent dural dissection.

The head is completely shaved the day prior to surgery so that the scalp and its scars can be totally evaluated and a decision made regarding the best type of incision. A well-healed linear scar overlying the defect may be utilized, if it is not anterior to the hairline. When the scar is stellate, irregular or thin, it is advisable to avoid reusing this scar for the incision, but to plan a scalp flap about the defect to insure adequate blood supply and uneventful healing. If the scar is anterior to the hairline, a concealed coronal scalp incision is planned.

An examination is also made for the presence of retained sutures or a protruding suture from the galeal layer. These are removed and local cleansing procedures performed until the area is unquestionably free of potential contamination, then cranioplasty is re-scheduled.

The thoroughly evaluated patient is then anesthetized, usually under general endotracheal anesthesia, and positioned such that when